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Reply to additional questions on the NREAP

Please find below our replies to the additional questions and requests for clarification sent by the European Commission's Directorate-General for Energy on 9 February 2011 relating to Spain's NREAP, submitted to the Commission on 6 July 2010 (the questions are set out in Annex I hereto).

Authorisation procedures (Q4.2.1):

The Directorate-General for Energy Policy and Mines of the Ministry of Industry, Tourism and Trade draws up and publishes the authorisation procedures that apply, *inter alia*, to energy production facilities in the *Boletín Oficial del Estado* (Spanish Government Gazette) and on its website. Annex II hereto contains an extensive list of procedures, with a short description of each, and the applicable legislation.

The Autonomous Communities are responsible for planning in the regions and duly publish their plans in their own Government Gazettes.

Grid development (Q4.2.6):

As regards the concrete steps referred to in the first question, in December 2010 *Red Eléctrica de España* (REE), the operator of the Spanish system sent the Ministry of Industry, Tourism and Trade a planning proposal for the period up to 2020, which is still under discussion. The planning includes three FACTS (flexible alternating current transmission systems) and three phase shifters in order to increase the flexibility of the transmission grid and permit improved management of the available generating capacity. Two of the FACTS are intended to improve distribution of flows in situations where excessive wind energy causes overloads of 220 kV lines.

With regard to the second question, access to the transmission grid is governed by Royal Decree No 1955/2000 (published in 2000) and operational procedures 12.1 and 12.2 (approved and published in 2005). These operational procedures, which detail the procedure for access, are given in Annex IV '*Decision of the Secretariat-General for Energy of 11 February 2005 approving a series of technical and instrumental procedures necessary for the proper technical management of the electricity system.*'

Lastly, in answer to the final request for clarification, operational procedure 12.1 (Annex IV) sets out the rules concerned and describes how costs are shared and the securities required for the construction of reinforcements. In addition, Royal Decree No 1955/2000 (Annex V) describes the planning procedure for the grid (Article 8 onwards). In Article 9, one of the general principles of the planning procedure is stated to be 'the elimination of restrictions that could lead to the overall cost of the energy supplied being higher' and 'the efficient incorporation of new generators into the



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system'. Also, operational procedure 13.1 (Annex VI: "*Decision of the Secretariat-General for Energy of 22 March 2005 approving the technical and instrumental operational procedure (13.1 – Criteria for the development of the transmission grid) necessary for the proper technical management of the electricity grid* ") sets out the technical criteria to be used in planning studies for the transmission grid and refers to the minimum generating capacity for the creation of a new substation.

Grid operation (Q4.2.7):

In its Decision of 28 April 2006, the Ministry of Industry, Tourism and Trade's Secretariat-General for Energy approved a series of technical and instrumental procedures necessary for the proper technical management of the island and extrapeninsular electricity systems. Those procedures provide detailed information that answer the three questions raised in this section. Annex III contains a list of the operational procedures published by *Red Eléctrica de España*, the operator of the Spanish electricity system, with the corresponding hyperlinks.

In addition, and more specifically relating to the second question in this section, it should be pointed out that the *Comisión Nacional de Energía* (the National Energy Commission), the regulator for the energy systems, as part of its duties, issues binding reports on matters referred to it by the Ministry of Industry and Energy, which include the various operational procedures drawn up by *Red Eléctrica de España*.

With regard to the first and third questions, it should also be noted that:

There are four operational procedures, listed below, that cover the management of the electricity system and payment for, and the integration and efficiency of, renewable energy within that system:

- OP 12.1 Access applications for the connection of new installations to the transmission grid.
- OP 12.2 Installations connected to the transmission grid: minimum design, equipment, operation, security and start-up requirements.
- OP 12.3 Response requirements in dealing with wind installation voltage dips.
- OP 14.8 Recipient of payment for special regime installations.

The necessary technical requirements to facilitate integration relate to:

- Permanent and temporary operating capacity over certain voltage and frequency ranges.
- Dynamic voltage control during disturbances, such as the AVR's (automatic voltage regulators) of conventional generators, to enable a reactive current to be injected during short-circuits. This ensures that it actively contributes to maintaining system voltage during short circuits and subsequent recoveries from short circuits, preventing voltage dips becoming any greater or more prolonged, thus contributing to the system's transient stability.
- Power/frequency control capacity and certain power-control requirements.



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In addition, the implementation of demand management has involved a change in the approach to operation of the system, which has traditionally been based on action on the supply side rather than on the demand side, which has been taken to be a 'given' for the electricity system. The demand management measures that can help achieve the objective sought fall into four types:

- Measures to 'reduce consumption' aim to reduce the total demand for electricity, without specifying at what points the reduction in demand occurs.
- Measures to 'move consumption from peak to off-peak periods' aim to permanently move loads from peak to off-peak periods, thus levelling out the demand curve.
- 'Increasing off-peak demand' aims to ensure that new demand on the system occurs preferably when demand is lowest.
- 'Peak-reduction mechanisms' aim to make capacity available to the system for use in emergency situations.

Existing demand-management mechanisms are targeted on moving consumption from peak to off-peak periods by means of lower off-peak tariffs and reducing peaks in critical situations through the service for managing supply-interruption demand and the installation of power limitation devices in homes.

However, in the current energy situation, with the EU's objectives for 2020, demand must play an active role in the operation of the electricity system, providing the operator with a degree of flexibility. With this aim in mind, *Red Eléctrica de España* has been working for some while to draw up a package of additional demand-management measures for consideration against the background of the 2010 objectives. These measures basically aim to promote changes in industrial consumption, to create special schemes of lower off-peak tariffs for electric vehicles, to develop the role of demand aggregators and load managers and to exploit the demand-management options made possible by new intelligent meters with remote-measurement and remote-management functions.

In order to support and facilitate the integration of energy from renewable sources into the transmission and distribution grid, energy storage systems will be needed to integrate non-manageable energy from renewable sources.

Against this background, hydroelectric energy produced by plants located at existing regulation reservoirs and pumping plants could play a very important role in achieving this objective, as this is an ideal way to compensate for irregularities in non-manageable renewable-source generation and for storage of any surplus electricity they produce. This is high-quality energy that contributes to the security and reliability of the electricity system as a readily available form of regulated energy that can offset supply and demand fluctuations while also offering flexibility to control grid frequency and voltage, service replenishment, etc.

The forecasts for the pumping capacity to be installed by 2020 have been drawn up taking account of the forecasts made by agents. In some cases, this will involve



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increasing the capacity of existing pumping plants and using, as a general rule, existing reservoirs. It is planned to achieve an additional 3 000 MW.

To conclude, it should be noted that one of the keys to integrating non-manageable generation from renewable sources are interconnections, so as to avoid the dumping that can occur when production capacity exceeds integration capacity. It is therefore vital to increase the commercial exchange capacity between Spain and France. Increasing the exchange capacity between Spain and Portugal would not help with the export of Spanish production surpluses since their geographical proximity means that when there are surpluses in Spain there are also surpluses in Portugal. The export of production surpluses that cannot be used requires not only an adequate commercial exchange capacity but also the right conditions to encourage the purchase of this energy by neighbouring countries.

Biofuels support schemes (Q4.5):

Royal Decree No 459/2011 of 1 April 2011 lays down the minimum obligatory annual targets for biofuels for 2011, 2012 and 2013. The Decree sets out three targets, expressed as minimum energy content for petrol, diesel and for total petrol and diesel sold or consumed.

	2011	2012	2013
Biofuel target for total diesel and petrol (%)	6.2	6.5	6.5
Biofuel target for diesel (%)	6.0	7.0	7.0
Biofuel target for petrol (%)	3.9	4.1	4.1

The 2011-20 Renewable Energy Plan, to be published within the next few months, will lay down similar targets at national level every year until 2020 as set out in Table 12 of the NREAP. The target in 2020 for energy from renewable sources as a percentage of the energy consumed in the transport sector will be more than the 10% laid down in Directive 2009/28/EC.

Biomass supply (Q4.6.1):

With regard to the introductory paragraph of this report, the Commission will be sent details of imports of biomass, which bear a very close relationship to the expected quantities up to 2020, together with the other amendments to the NREAP following approval of the new Spanish energy mix.



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In 2006, there were no significant energy crops with quantifiable areas in Spain. Therefore, Table 8 is as follows:

Table 8: Current agricultural land use for production of crops dedicated to energy in 2006

Agricultural land use for production of dedicated energy crops	Area (ha)
1. Land used for short rotation trees (willows, poplars)	0
2. Land used for other energy crops such as grasses (reed canary grass, switch grass, Miscanthus), sorghum	0

Table 10:

Table 10 of the NREAP has been amended so that the totals for hydroelectric energy, both for the total installed hydroelectrical capacity (MW) and gross generation of hydroelectric energy (GWh), include neither the installed capacity of pure+mixed pumping plants nor the gross generation of hydroelectricity from pure+mixed pumping. The total gross electricity generation from all renewable sources includes neither the installed capacity of pure+mixed pumping plants nor the gross generation of hydroelectricity from pure+mixed pumping. This means that the data for power and electricity generation for a given year (in the same line of Table 10) will be consistent.

With regard to the second question, Table 10 has been amended so that the installed pumping capacity also includes mixed pumping.

With regard to the introductory paragraph of this report, the Commission will be sent Table 10 together with the other amendments to the NREAP following approval of the new Spanish energy mix.